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Arent Fox Kintner Plotkin & Kahn PLLC
1050 Connecticut Avenue NW
Suite 600
Washington, DC 20036-5339

EXAMINER

SOUW, BERNARD E

ART UNIT PAPER NUMBER

2881

DATE MAILED: 12/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/629,618

Applicant(s)

KABASAWA, MITSUAKI

Examiner

Bernard E Souw

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☒ Claim(s) 6, 22 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

FINAL REJECTION

1. The Amendment A, filed on 11/05/2002, Paper No.6/A, in response to the first Office Action dated 06/24/2002 has been entered. The present Office Action is made with all the suggested amendments being fully considered.

(a) The Specification has been amended. A new specification has been filed in paper No.6/A to substitute the original one.

(b) Claims 1-24 have been amended. Accordingly, claims 1-24 are pending in this Office Action.

Objections to Specification

2. The objected informalities in the disclosure having been amended, the previous objections of lines 12-13 on page 9 and lines 12-18 on page 13 are herewith removed.

3. The following are ***new objections*** of the amended specification:

[0005] recites, "Here the *"energy contamination"* is defined as a ***particle*** ...". By all means, *energy contamination* is never defined as being a *particle*, as generally understood in the art.

[0044], [0046], [0047], [0049] ... etc.: The term I_{ID} in Eq.(2), Eq.(4), Eq.(6), and etc., is *undefined*. In consequence, the term *energy contamination ratio* is ***undefined*** by the Specification. In order to proceed with the Office Action, the definition of "*energy contamination ratio*" is taken from claim 1, which defines the ratio of energy contamination in terms of measurable beam currents. This, however, has been

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amended by introducing New Matter (*energy* replaced by *electric current*), as described in a next section. Therefore, all [amended] claims reciting the undefined term "*energy contamination (ratio)*" are deemed invalid because of the New Matter introduced in its definition. Accordingly, [amended] claims 1-24 are all rejected based on 35 U.S.C. 132 (see next section).

Claim Objections

4. Claim 22 [amended] remains objected to by the Examiner because of the [amended] wording "*starts to impinge a wafer*". It should better read, "*starts to impinge **on** (or onto, or upon) a wafer*" (see, e.g., Merriam Webster's Collegiate Dictionary, 10th edition, 2002, pg.581). This is a second objection, solely caused by Applicant's non-compliance to Examiner's correction and suggestion brought up in the 1st Office Action.

5. Claim 23 [amended] is objected to by the Examiner, because it recites a phrase in duplicate and has an unmatched deletion bracket. This is a **new** § 112 objection, or better still, rejection.

In this regard, the Applicant is advised that the (ratio) of implanted ion energy to the extracted ion energy has no impact on the energy contamination, as long as the beam transport efficiency is sufficiently high. The Applicant is further advised to drop-off claim 23, for being based on false understanding of the subject matter of Applicant's own invention.

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 6 remains rejected under 35 U.S.C. 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because the replacement of the phrase "*determined **with a reference to***" by the wording of "*determined **in consideration of***", as amended, has failed to make the claim comprehensible, thus rendering the claim indefinite.

8. Claim 9 remains rejected under 35 U.S.C. 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because (a) the step of setting a beam transport efficiency to a predetermined value cannot possibly decrease a neutral fraction of the beam, because the transport efficiency is an undefined, hence unknown, quantity; and (b) a mere action of "*monitoring the beam transport efficiency*" will never reduce the energy contamination, unless something real is being done, as already addressed in the 1st Office Action.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claim 4 remains rejected under 35 U.S.C. 101 because it is directed to a non-statutory subject matter, in this case, physical law. This has been already addressed in the 1st Office Action. Applicant has obviously ignored this previous 35 U.S.C. 101 rejection.

11. Claim 6 [amended] is rejected under 35 U.S.C. 101 because its limitation does not belong to an apparatus claim as specified in its preamble. A *ratio*, which is an abstract concept, cannot possibly be a part of *an apparatus*. This 35 U.S.C. 101 rejection replaces a previous 35 U.S.C. 112, second paragraph, rejection.

12. Claim 6 [amended] is also rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. Even regarding claim 6 as being a method claim, the step of determining the ratio of energy contamination *in consideration* of a deceleration ratio, is completely ineffective, because the *act of considering* is not a real step that is absolutely necessary to accomplish something real, as claimed. This 35 U.S.C. 101 rejection now replaces a previous 35 U.S.C. 112, 2nd.paragraph, rejection.

35 U.S.C. 132 Rejection (New Matter)

13. The amendment A (Paper No.6/A), filed 11/05/2002, is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added materials which are not supported by the original disclosure are as follows:

In claim 1, the substitution of "*means for measuring (....) beam **electric currents** (.....)*", as amended, for the previously rejected original wording, "*means for measuring (....) beam **energy** (.....)*", is an introduction of New Matter.

Applicant's argument on pg.9 of Amendment A, that "*the term "beam energy" may be quantified in terms of beam electric current*", is **incorrect**, and hence, *rejected* by the Examiner. "Beam energy" and "beam current" are fully different and mutually independent physical quantities. Quantification of one in terms of the other is not possible without introducing New Matter (previously not recited in Applicant's original disclosure). The New Matters required for such a conversion are: ion mass, ionic electric charge, beam diameter and/or ion detector diameter, and a formula relating "beam energy" to "beam current", all of which are not recited in the specification, neither the original nor the amended one.

Consequently, claim 1 and all the dependent claims thereof, i.e., claims 2-6, are rejected based on 35 U.S.C. 132.

14. Claims 7-9, 11-15, 17, 19, and 21-24, either directly or indirectly recite a "*beam transport efficiency*", which is undefined in the original, as well as the amended specification, due to the undefined quantity I_{ID} in the defining equations. Therefore, as recited previously, the definition of "*beam transport efficiency*" cannot be interpreted in light of the specification, but instead, must be taken from claim 1. However, claim 1 is invalid due to introduction of New Matter in Amendment A. Consequently, claims 7, 9,

11-15, 17, 19, and 21-24, as amended, are also rejected under 35 U.S.C. 132, as applied to claim 1 above.

15. In summary, [amended] claims 1-9, 11-15, 17, 19 and 21-24, reciting either directly or indirectly the undefined term "energy contamination", are deemed invalid because of the New Matter introduced in its definition. These means, [amended] claims 1-7, 9, 11-15, 17, 19 and 21-24 are all rejected based on 35 U.S.C. 132 (see next section).

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Arguments

16. Applicant's arguments filed 11/05/2002, have been fully considered but they are not persuasive. The following is the Examiner's response to Applicant's arguments:

► In full contradiction to Applicant's statement, the term "beam energy" cannot be quantified in terms of beam electric current without introducing New Matters. This has been previously addressed in reference to the above rejections under 35 U.S.C. 132.

► Regarding claim 4, Applicant has properly changed the word "*beam transportation efficiency*" into "*beam transport efficiency*". However, this was not the ground for the previous 35 U.S.C. 101 rejection of claim 4, which is based on a ***non-statutory*** subject matter, in this case physical law. A claim limitation cannot consist ***only*** of such ***non-statutory*** subject matter(s), unless the latter is recited in combination with real parts

(apparatus claim) and/or real step (method claim). Furthermore, the physical law being recited is generally known in the art, as already recited in the 1st Office Action.

► All amendments filed 11/05/2002 with paper #6/A have failed to render any claim become patentable. All claims 1-24, as amended or not, remain rejected for the same reason and over the same prior art as applied previously in the 1st Office Action. For clarity, all claim rejections are repeated below. If there is a new ground of rejection, then the latter must have been solely necessitated by Applicant's amendment.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-24 [amended] are rejected under 35 U.S.C. 103(a) as being unpatentable over Adibi et al. (USPAT # 5,883,391).

18. Insofar the Examiner can ascertain beyond the above rejections under 35 U.S.C. § 132 (New Matter), claim 1 remains rejected under 35 U.S.C. 103(a) over Adibi et al.

Even if Applicant's amendment were not a New Matter, calculating the beam transport efficiency from the result of a measurement of charge-exchange ions by an auxiliary ion detector, as in Adibi's (61 in Fig.1), is an ***obvious alternative*** to Applicant's

measurement of *ion beam current*, if not technically even simpler and the result even more accurate (e.g., compared to Applicant's error bars, *inherent but not shown* in Fig.4). Both the idea and the motivation to modify Adibi's invention by an obvious alternative (i.e., measuring the beam current using a retractable ion detector) do not need any teaching by prior art, but can be derived from ordinary skill in the art by common sense alone.

It is important to note that Adibi's is here used in a 35 U.S.C. 103(a) rejection, not a 35 U.S.C. 102 rejection. As already recited in the 1st Office Action, it would have been obvious to one of ordinary skill in the art by the time the invention was made to indirectly measure the neutral beam equivalent-current from its known proportionality to the ion beam current at the target wafer, and then derive the *energy contamination* over the transport efficiency, instead of measuring the neutral beam equivalent-current over the slow ions resulting from charge-exchange processes by means of a field electrode, as suggested by Adibi et al., since it is well known to one of ordinary skill in the art that the degree of *contamination by high energy neutrals* is proportional to the neutral beam equivalent-current, and hence, the two methods are equivalent alternatives.

19. Claims 2-6 (dependent of claim 1) have been amended in such a manner that all the previously applied rejections are still valid in full extent. Therefore, claims 2-6 remain rejected over the same prior art, along with the parent/base claim 1.

20. Claims 7-9 (with claims 7 & 9 as parent claims) remain rejected over the same prior art as applied previously in the 1st Office Action. The only difference is the method of obtaining beam transport efficiency from the measurement of ion beam current, instead of Adibi's charge-exchange ion current, the latter being directly equal to the amount of neutral particles produced in the beam, as already recited in the previous Office Action, as well as in the above rejections of claims 1-6.

21. Regarding the amended claim 10, due to the amended recitation of a "*neutral beam*", the claim has become a broad claim that is completely covered by Adibi's in its original version, meaning that Adibi's is even applicable in a 35 U.S.C. 102 rejection.

22. Insofar as the Examiner can discern beyond the previous rejections under 35 U.S.C. 132 and 35 U.S.C. 112, claims 11-23 (all dependent on claim 10) and the independent claim 24, as amended, remain rejected under 35 U.S.C. 103(a) over Adibi et al., mainly because all the respective amendments have failed to remove the validity of the rejections previously applied in the 1st Office Action.

Specifically regarding claims 15, 20, 23 and 24, the limitations as amended are no more than automation and/or computerization of steps that are normally performed manually, as in the prior art of Adibi et al.

It has been held by the court that broadly providing a mechanical or automatic means to replace manual activity which has accomplished the same result involves only routine skill in the art. *In re Venner*, 120 USPQ 192. The same argument applies to a

computerization of a process or method, as in claim 24, which basically does nothing else than providing an automation of a complete sequence of process steps in combination with a large capacity of memory.

Final Rejection

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. Besides, Applicant's Amendment A has failed to remove previous rejections applied in the 1st Office Action. In addition, Applicant has ignored many claim rejections and/or objections under 35 U.S.C. 101 and 112. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 703 305


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0149. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 703 308 4116. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9318 for regular communications and 703 872 9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

bes
December 5, 2002


BRUCE ANDERSON
PRIMARY EXAMINER